

Exploring How to Make System Safety Work in Transit

Department
of Transportation
**Federal Transit
Administration**

U. S. Department of Transportation
Research and Special Programs Administration
John A. Volpe National Transportation Systems Center
Cambridge MA 02142

December 1994
Final Report



FEDERAL TRANSIT ADMINISTRATION

NOTICE

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

NOTICE

The United States Government does not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the objective of this report.

HE
4381
.K53
1994

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE December 1994		3. REPORT TYPE AND DATES COVERED Final Report December 1993 - December 1994	
4. TITLE AND SUBTITLE Exploring How to Make System Safety Work in Transit				5. FUNDING NUMBERS TT524/U5019	
6. AUTHOR(S) David Knapton					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Department of Transportation Research and Special Programs Administration John A. Volpe National Transportation Systems Center Cambridge, MA 02142-1093				8. PERFORMING ORGANIZATION REPORT NUMBER DOT-VNTSC-FTA-94-10	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Department of Transportation Federal Transit Administration Office of Technical Assistance and Safety 400 7th Street, SW Washington, DC 20590				10. SPONSORING/MONITORING AGENCY REPORT NUMBER FTA-NY-90-A002-94-1	
11. SUPPLEMENTARY NOTES					
12a. DISTRIBUTION/AVAILABILITY STATEMENT This document is available to the public through the National Technical Information Service, Springfield, VA 22161				12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) The New York Metropolitan Transportation Authority (MTA) and its operating elements, the New York City Transit Authority (NYCTA), the Long Island Rail Road (LIRR), Metro-North Commuter Railroad, Long Island Bus (LI Bus, formerly called the Metropolitan Suburban Bus Authority), and the Staten Island Rapid Transit Operating Authority were subjected to the largest and most comprehensive safety inspection ever conducted of a public transit system. Authority for the inspection, conducted by the Federal Transit Administration (FTA) was drawn from Section 22 of the Urban Mass Transportation Act of 1964 and Section 339 of the Department of Transportation and Related Agencies Appropriations Act of 1990. The investigation, which consisted of top-down interviews and on-site inspections, involved a detailed review to identify safety and security hazards. The investigation revealed many areas of concern, including that system safety programs, and in particular, the implementation of the System Safety Program Plan (SSPP) were not functioning properly. In response to the findings, the MTA requested the assistance of the FTA in addressing those issues relating to an effective system safety process and an effective system SSPP. Recognizing that this may be a national issue, the FTA in conjunction with the New York State Public Transit Safety Board (PTSB) and MTA sponsored this workshop. The workshop was attended by 38 individuals, representing the MTA, PTSB, industry, and U.S. Department of Transportation. The workshop introduced 142 issues relating to system safety and proposed 69 solutions. The attendees ranked the proposed solutions and agencies and identified where action would be initiated to implement the top 18 solutions.					
14. SUBJECT TERMS Safety, Security, System Safety, New York Metropolitan Transportation Authority, NYCTA, LIRR, Metro-North, LI Bus, New York State Public Transportation Safety Board, Oversight				15. NUMBER OF PAGES 64	
				16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified		20. LIMITATION OF ABSTRACT	



PREFACE

This report describes the two-day workshop sponsored by the Federal Transit Administration (FTA), the New York State Public Transportation Safety Board (PTSB), and the Metropolitan Transportation Authority (MTA) that was held in New York City, on September 21-22, 1993. The purpose was to develop ideas for improving safety at the transit systems operating under the MTA through more effective use of system safety principles and the System Safety Program Plans that meet the needs of both the MTA and the PTSB. These plans are produced by each operating agency of the MTA and approved by the New York State Public Transportation Safety Board.

The report attempts to be concise and yet not lose the detail which was a valuable part of the workshop. The format presents summaries and aggregations in the body of this document, while the appendices give the details at the lowest level of transcription taken at the individual sessions. The tabulations in the appendices are informative as they often show detailed information before it was aggregated. Readers are cautioned, however, that with this type report, where information is aggregated and then ranked by vote, there is the danger that supporting material can be missed and important points obscured. Additionally, the process can influence the results by arbitrarily focusing on some activities and not on others.

Major contributors to organizing the workshop were Linda Kleinbaum, Senior Deputy Director of Planning, Metropolitan Transportation Authority; and Carmen Bianco, Assistant Vice President, Office of Safety, New York City Transit Authority, both of whom hosted the meeting; Edward Plasberg, Executive Director, New York State Public Transportation Safety Board; Ronald Kangas, Office of Technical Assistance and Safety, Federal Transit Administration, and Project Manager, FTA Safety Investigation of the New York MTA and its operating elements; and William Hathaway, John A. Volpe National Transportation Systems Center. In addition, Professor Peggy Brouse, School of Information Technology and Engineering, George Mason University, contributed to planning the workshop and she and members of her staff acted as workshop transcribers. Cheryl Kennedy, New York City Transit Authority; John Fabian, New York State Public Transportation Safety Board; and Susan Gilbert, Interactive Element, Inc., were facilitators for the three working groups which independently proposed and discussed the issues and solutions.

One of the suggestions offered at this workshop was to reconvene in a year. This short report should help focus any such follow-on, as well as offer suggestions for improving safety at other transit agencies.

METRIC/ENGLISH CONVERSION FACTORS

ENGLISH TO METRIC

LENGTH (APPROXIMATE)

1 inch (in) = 2.5 centimeters (cm)
 1 foot (ft) = 30 centimeters (cm)
 1 yard (yd) = 0.9 meter (m)
 1 mile (mi) = 1.6 kilometers (km)

METRIC TO ENGLISH

LENGTH (APPROXIMATE)

1 millimeter (mm) = 0.04 inch (in)
 1 centimeter (cm) = 0.4 inch (in)
 1 meter (m) = 3.3 feet (ft)
 1 meter (m) = 1.1 yards (yd)
 1 kilometer (k) = 0.6 mile (mi)

AREA (APPROXIMATE)

1 square inch (sq in, in²) = 6.5 square centimeters (cm²)
 1 square foot (sq ft, ft²) = 0.09 square meter (m²)
 1 square yard (sq yd, yd²) = 0.8 square meter (m²)
 1 square mile (sq mi, mi²) = 2.6 square kilometers (km²)
 1 acre = 0.4 hectare (he) = 4,000 square meters (m²)

AREA (APPROXIMATE)

1 square centimeter (cm²) = 0.16 square inch (sq in, in²)
 1 square meter (m²) = 1.2 square yards (sq yd, yd²)
 1 square kilometer (km²) = 0.4 square mile (sq mi, mi²)
 10,000 square meters (m²) = 1 hectare (he) = 2.5 acres

MASS - WEIGHT (APPROXIMATE)

1 ounce (oz) = 28 grams (gm)
 1 pound (lb) = 0.45 kilogram (kg)
 1 short ton = 2,000 pounds (lb) = 0.9 tonne (t)

MASS - WEIGHT (APPROXIMATE)

1 gram (gm) = 0.036 ounce (oz)
 1 kilogram (kg) = 2.2 pounds (lb)
 1 tonne (t) = 1,000 kilograms (kg) = 1.1 short tons

VOLUME (APPROXIMATE)

1 teaspoon (tsp) = 5 milliliters (ml)
 1 tablespoon (tbsp) = 15 milliliters (ml)
 1 fluid ounce (fl oz) = 30 milliliters (ml)
 1 cup (c) = 0.24 liter (l)
 1 pint (pt) = 0.47 liter (l)
 1 quart (qt) = 0.96 liter (l)
 1 gallon (gal) = 3.8 liters (l)
 1 cubic foot (cu ft, ft³) = 0.03 cubic meter (m³)
 1 cubic yard (cu yd, yd³) = 0.76 cubic meter (m³)

VOLUME (APPROXIMATE)

1 milliliter (ml) = 0.03 fluid ounce (fl oz)
 1 liter (l) = 2.1 pints (pt)
 1 liter (l) = 1.06 quarts (qt)
 1 liter (l) = 0.26 gallon (gal)
 1 cubic meter (m³) = 36 cubic feet (cu ft, ft³)
 1 cubic meter (m³) = 1.3 cubic yards (cu yd, yd³)

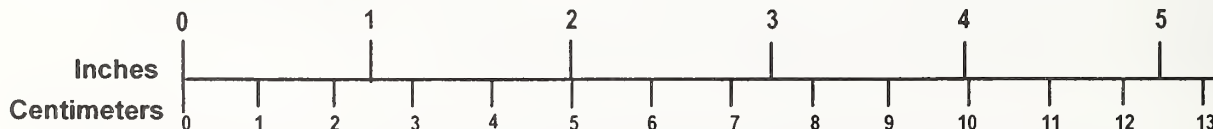
TEMPERATURE (EXACT)

$[(x-32)(5/9)]^{\circ}\text{F} = y^{\circ}\text{C}$

TEMPERATURE (EXACT)

$[(9/5)y + 32]^{\circ}\text{C} = x^{\circ}\text{F}$

QUICK INCH - CENTIMETER LENGTH CONVERSION



QUICK FAHRENHEIT - CELSIUS TEMPERATURE CONVERSION

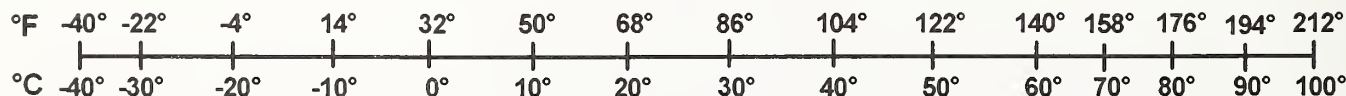


TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1. INTRODUCTION	1
1.1 Workshop Goal and Objective	2
1.2 Workshop Format and Logistics	2
1.3 Overview	3
2. ISSUES	5
2.1 Discussion	5
2.2 Identification of Issues	5
3. PROPOSED SOLUTIONS	9
3.1 Discussion	9
3.2 Summary of Proposed Solutions	9
3.3 Identification of Proposed Solutions	15
3.4 Suggested Action	21
4. CONCLUSIONS	25
APPENDIX A. ORGANIZATION OF WORKSHOP	A-1
APPENDIX B. TABULATION OF IDENTIFIED ISSUES	B-1
APPENDIX C. POST WORKSHOP CORRESPONDENCE AND ACTION . . .	C-1

LIST OF TABLES

<u>Table</u>	<u>Page</u>
3-1 Workshop Solutions by Groups	10
3-2 Solution Votes for All Groups	17



DEFINITIONS

In this report, the following terms and their definitions are used:

Safety Freedom from accidental harm. Safety in transit applies to patrons, employees, and the public affected by transit activity.

Security Freedom from intentional harm.

System Safety

The systematic application of sound management and engineering principles throughout all phases of a system's life cycle to achieve the highest levels of safety consonant with operational effectiveness and cost. Effective system safety programs have at least the following four key attributes:

- A commitment from highest levels of the organization to the concept of system safety;
- A plan that defines the applicable policies, codes, and standards; sets goals for the organization and its components; defines authorities and responsibilities for the components of the organization; and establishes a hazard resolution process;
- An effective organizational entity with primary responsibility for enforcing the plan and performing certain activities defined in the plan; and
- Widespread understanding and acceptance throughout the organization of the concepts of system safety.

System Safety Program Plan (SSPP)

The plan that meets the SSPP requirements stated above. (In New York state, all public transit organizations must submit an SSPP to the New York State Public Transportation Safety Board for approval.)

Hazard A condition that can cause injury or death, damage to or loss of equipment, service, property, or environmental harm.

Note: This document was prepared primarily to assist in improving safety at the operating authorities under the New York Metropolitan Transportation Authority. Throughout this report the terms referring to these operating authorities are taken directly from the workshop, reflecting the usage of the participants. The terms are used interchangeably and include "agency," "operating element," "property," and "authority."

ABBREVIATIONS

APTA	American Public Transit Association
EPA	Environmental Protection Agency
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GMU	George Mason University
LIRR	Long Island Rail Road
MSBA	Metropolitan Suburban Bus Authority
MTA	Metropolitan Transportation Authority
MNCR	Metro-North Commuter Railroad
NYCTA	New York City Transit Authority
OSHA	Occupational Safety and Health Administration
OSS	Office of System Safety
PMO	Project Management Oversight
PTSB	New York State Public Transportation Safety Board
SSPP	System Safety Program Plan

EXECUTIVE SUMMARY

In April, 1989, at the request of members of the New York congressional delegation, the Federal Transit Administration (FTA) initiated a safety investigation of the New York Metropolitan Transportation Authority (MTA) and its operating authorities. This was the largest and most comprehensive safety investigation ever conducted of a public transit system. Two main conclusions drawn from many of the 352 key findings uncovered during the investigation are as follows:

- *The system safety approach to achieving safe transit, which systematically examines the people, equipment, procedures, and environment in which the transit system operates, was not being adequately followed; and,*
- *Implementation of the System Safety Program Plan, which formally describes responsibilities, actions, and activities necessary to implement the goals and objectives of the system safety concept, was also failing.*

As a result, the MTA requested the assistance of the FTA in addressing those issues relating to an effective system safety process and an effective System Safety Program Plan. In response, the FTA, who recognized this as a national issue, acted in conjunction with the New York State Public Transportation Safety Board and the MTA to sponsor this workshop, "Exploring How to Make System Safety Work in Transit," on September 21 and 22, 1993.

The workshop was attended by 38 individuals, consisting of operators, overseers, regulators, and safety experts. Working in three parallel teams led by facilitators, they participated in three sessions during which issues were identified, and solutions were proposed and ranked. In the course of the two day workshop, the three parallel teams introduced 142 safety issues and proposed 69 solutions. The 69 solutions were voted upon by the participants to give a sense of their relative priority. In addition, the top 18 suggested solutions were considered sufficiently important that action be initiated in the near future. In some cases, the participants noted that, while they supported the action, they could not make formal commitments for their organizations.

The following are conclusions from the workshop, based on the discussions held at the various sessions and the proposed solutions adopted by the participants:

1. The system safety concept is supported by this workshop as the best means to achieve the highest level of safety that is practical. It provides a framework for implementing many of the proposed solutions of this workshop and for achieving the goal of safety.
2. Identified issues and proposed solutions for improving system safety and its implementation center around two areas. Both are considered necessary since safety requires both. Essential are: 1) a safety plan that meets the requirements of oversight and the features of each transit agency; and 2) the vigorous implementation of the plan.

3. The System Safety Program Plan is necessary for implementing system safety and it must meet the specific characteristics of each agency. The plan should be promoted by top management, be contributed to and designed for all management, and include all safety activities.
4. Strong top management support for implementation of system safety within the transit agencies is essential. This includes CEOs and presidents. To meet this end, the workshop stated that top management training in highly focused training sessions on system safety concepts is necessary.
5. Training at all levels in system safety and in job related safety responsibilities should also be increased. Such training could establish the basis for safety accountability.
6. Personal accountability for safety failures is a necessary addition to individual performance records. Everyone in a transit agency should be included.
7. There are safety related efforts that transit agencies can introduce to improve safety in the areas of training, assigning responsibility, and internal communication.
8. There is a need for better cost accounting of all aspects of accidents and safety.

Throughout the workshop, in formal sessions and in informal discussions, it became exceedingly apparent that to create safety at its highest practical level, it is necessary to have an effective SSPP that meets the requirements of both the operating agency and its oversight body. The participants agreed that new concepts in the field of safety should be examined to see if they could be made part of the SSPP and contribute to system safety. Receiving considerable participant approval were the proposals for personal accountability for safety, a concept that is being adopted in some private industrial companies. There was a strong message from the participants that safety accountability, from the top-down, is needed; and to insure accountability, safety performance should be part of each individual's performance review. Lastly, the participants voiced their enthusiasm throughout the workshop for the opportunity to examine common problem areas and to propose solutions with people from other organizations.

1. INTRODUCTION

In response to Section 339 of the Department of Transportation and Related Agencies Appropriations Act of 1990, the Federal Transit Administration (FTA) initiated, under the authority of Section 22 of the Urban Mass Transportation Act of 1964, as amended, a safety investigation of the New York Metropolitan Transportation Authority (MTA) and its operating elements. The investigation examined all of the safety related activities of the New York City Transit Authority (NYCTA), Staten Island Rapid Transit Operating Authority (SIRTOA), Long Island Rail Road (LIRR), Metro North Commuter Railroad (MNCR), Metropolitan Suburban Bus Authority (MSBA), and the MTA headquarters.¹

The investigation findings revealed that among the many areas of concern, the System Safety Programs and, in particular, the implementation of the System Safety Program Plan (SSPP) within the MTA operating authorities, were not functioning properly. Three examples of the findings of the safety investigators were:²

- The SSPP is of little value for promoting broad acceptance of safety related activities
- The SSPP does not embody the full extent of the safety program
- The roles, responsibilities and interfaces between the operations safety and the systems safety departments are not defined clearly

Responding to these findings in their Corrective Action Plan, the MTA requested the assistance of the FTA in addressing those issues relating to an effective system safety process and an effective SSPP. Replying to this request and recognizing that it this may be a national issue, the FTA, in conjunction with the New York State Public Transportation Safety Board (PTSB) and the MTA, sponsored this workshop entitled, "Exploring How to Make System Safety Work in Transit." This document presents the results of that workshop held in New York City on September 21-22, 1993 (the workshop agenda is contained in Appendix A).

¹ The Federal Transit Administration investigation included contractor performed on-site inspections of the Metropolitan Transportation Authority, New York Transit Authority, Staten Island Rapid Transit Operating Authority, Metropolitan Suburban Bus Authority, and those activities of the two commuter rail operations, Long Island Rail Road and Metro-North Commuter Railroad, that do not come under Federal Railroad Administration (FRA) regulation. The FRA conducted a parallel investigation of those activities which it regulates at the two commuter railroads.

² The FTA investigation is summarized in "New York Metropolitan Transportation Authority Safety Investigation," Federal Transit Administration, Rep. No. FTA-NY-A002-93-1/DOT-VNTSC-FTA-93-4, June 1993.

1.1 WORKSHOP GOAL AND OBJECTIVE

The goal of the workshop was to "develop a workable system safety process that meets the needs of the MTA and the New York State Public Transportation Safety Board (PTSB)."³ To accomplish this goal, the workshop focused on the System Safety Program findings developed in the Section 22 investigation of the MTA transit systems. To assist the workshop attendees in addressing these findings, they were asked to first identify what issue(s) prevented the attainment of that goal and to then identify solutions or actions that might be taken to resolve those issues.

1.2 WORKSHOP FORMAT AND LOGISTICS

The workshop was attended by 38 individuals⁴ who, working in groups led by a facilitator and chairperson, participated in three group sessions during which the issues were identified, and solutions were proposed and then ranked. Each participant was assigned to the same group for all three sessions. The groups met concurrently and each addressed the same goals and questions as the other groups. The safety issue generation, structuring, discussion and ranking were done by the individual group participants.

After an initial plenary discussion of the workshop goals and objectives the participants were asked to convene in the preassigned groups for Session 1. At this session they were asked to identify and define the issues that prevented attainment of the workshop goal. To assist in this effort, the workshop attendees were asked to consider the following three questions in their working groups:

- What is the purpose/objective of a System Safety Program/Plan and who is it for?
- What is the best way to achieve the purpose/objective identified above?
- How can we get everyone to accept and use the System Safety Program/Plan on a daily basis?

At the conclusion of the first group sessions, the group chairpersons provided the plenary session with summaries of their findings. During Session 2, the individual groups were allowed to add to their initial lists any issues selected from the discussions of the other groups. They then proceeded to identify the solutions and actions required to address the identified issues. At the conclusion of the session, each group chairperson presented the solutions and required actions identified by their group.

In Session 3, the solutions proposed earlier were voted on by the participants. Where possible, the participants identified action for the proposed solutions along with agencies that were

³ The PTSB was created by the New York State Legislature to provide safety oversight of those transportation agencies within the State of New York that receive State Mass Transportation Operating Assistance. Included in the PTSB responsibilities is approval of System Safety Program Plans required from each transportation agency.

⁴ A breakdown of the participants showed 19 from the MTA and its operating elements, 8 from the U.S. Dept. of Transportation, 6 from the PTSB, and 5 from industry.

considered most appropriate for taking the action. The ranking results are summarized in Section 3.

1.3 OVERVIEW

This workshop was a unique opportunity for transit operators, overseers, regulators, and safety personnel to face the common goal of improving transit safety. The approach taken in the workshop was to examine why the SSPP was not working as it should. The three workshop groups, working in parallel sessions, spent two days probing the issues and basic causes of system safety and the SSPP's difficulties. In attempting to improve these problem areas, the workshop introduced 142 safety issues and proposed 69 solutions. While there was some redundancy between the three groups, the discussions among the participants in each of the workshop sessions examined many sides of each issue.

Information disclosed in the discussion and results of this workshop may find application in many transit activities throughout the country. Various issues, proposed solutions, or elements of each, could suggest responses for those agencies where problems exist, or even where there are problems that are not being recognized.

2. ISSUES

2.1 DISCUSSION

In the charge to the workshop, participants were asked for a free-flowing uninhibited discussion and were specifically requested not to include solutions in the sessions on issues. The three workshop groups produced a total of 142 issues. Some of the issues had common elements; therefore, to simplify review of the workshop, they have been integrated and organized in this section (the issues presented by each group are given in Appendix B). This classification is based on the eleven general categories proposed by the workshop facilitators. For this report, the eleven categories are combined into three groups:

- | | | |
|----|----------------------------|---|
| 1. | Management Role | Need for training and an understanding of system safety starting at the top, top-down accountability, need for more resources |
| 2. | System Safety Program Plan | Need for implementation of the plan and its philosophy, limitations of plan contents and need for more flexibility |
| 3. | Safety Process | Reasons to use system safety and best methods for achieving safety, importance of understanding full costs of accidents |

In Section 2.2, these three major groups are listed. Located under each are associated categories and a summary.

2.2 IDENTIFICATION OF ISSUES

1. Management Role

- System safety should be a top-down process.
- There is a lack of top management understanding the system safety process.
- Training is a need at all levels.
- Implementation of existing SSPPs is not adequately helping to improve safety.
- Accountability/responsibility for safety is everybody's business, including top management's.
- Safety departments need more resources, management support.

The issue receiving most consideration in the three group sessions on issues was the need for management training and an understanding of system safety. System safety is a top-down process and strong leadership is essential. The participants felt that top management should be more proactive to raise safety to the highest practical level.

Educating management about the need for systems safety was considered necessary because management is not sufficiently informed. This is due in part to their general lack of technical background and operations experience. System safety is parallel to a good management plan and it needs sufficient participation to assure that all elements buy into it.

Training deficiencies in systems safety were noted at all levels, from top management to the lowest level. Two of the specific needs cited were training in system safety principles and details, and developing methods for cost/benefit studies.

Several participants stated that there were other safety related activities which could improve implementation. Intra-agency communication in regard to safety issues was considered by some to be an ever present area for improvement. Coordination between the elements of the transit authority was very important.

Lack of personal accountability in current operations was given significant attention in the discussions and a strong need for accountability was presented. Along with a lack of accountability in existing transit operations, related issues included such factors as lack of responsibility for carrying out safety related tasks and, in some instances, not even knowing that safety responsibilities existed. The capacity to provide safety should be part of both initial and continued employment.

Deficiencies were noted in personal accountability, interdepartmental coordination, training, and resources. Participants stated that safety departments needed more financial support, manpower, authority, and top management support to effectively develop, implement, and evaluate the safety program at their own transit authorities.

2. System Safety Program Plan (SSPP)⁵

- The SSPP implementation process is not adequate to help improve safety at the agencies.
- The SSPP should be written by and for the transit organization, reflecting the organization's objectives (not satisfying an audit function).
- There is need for a comprehensive plan to promote safety.
- The current SSPP is directed toward passenger and operational safety.

Many aspects of the SSPP were discussed. The two main issues that developed were the desire for a more tailored SSPP for each agency and the need to effectively implement the plan once it is in place.

⁵ SSPPs are required in New York State by all public transit organizations receiving state funds. State law mandates the New York PTSTB to require, review, approve, and monitor SSPPs developed by the transit organizations. Other state agencies monitor health and environment.

Some transit agency participants stated that the SSPP, in its present form, did not contribute to their safety activity.⁶ Points raised included questioning the need for an SSPP. Specific issues raised about SSPPs were: (1) problems with the guidelines for the SSPP that are imposed by an outside oversight agency; (2) extensiveness of contents (should the SSPP include environmental and health safety); (3) preparation (who prepares which parts of the SSPP); (4) format (how can the SSPP be made readable); and (5) custodial problems (how can the document be made available to those who need it).

It was suggested that the SSPP include the following: (1) interface information that lays out responsibility, accountability, and contact points for all potentially affected departments and outside agencies (the SSPP should further outline the hazard identification and resolution process for that agency); (2) a statement of the agency safety goals and a reminder that they must be realistic and achievable; (3) an implementation plan; and (4) the process by which safety and the success of the SSPP will be measured.

There was a desire indicated by participants from the agencies to give the SSPPs broader coverage than is currently required by state oversight. These participants stated that there was a need to have one plan which included safety requirements to meet areas now covered by environmental oversight (EPA) and worker health/safety, now covered by labor and occupational requirements (OSHA). It was pointed out by some participants that APTA SSPP guidelines cover more than PTSB requirements.

Participants from the largest transit agency, NYCTA, suggested that permitting the agencies to prepare their plan in sections, over a period of time, would greatly reduce the burden on the safety department. Difficulties were perceived by other participants who pointed out that the SSPPs can be out of date in some areas by the time they are completed and that taking a longer time would compound this problem.

Readability of the SSPP was a major discussion point in the workshop. Problems with SSPPs being too large and not presented in a user-friendly format were discussed. Participants suggested the need to limit the amount of material in the SSPP, stating that it does not have to include everything. The need for a system description in the plan was questioned. Some participants stated that the SSPP should be a framework for referencing sources. The use of appendices for containing much of the contents was discussed.

3. Safety Process

- Who is it for?
- What is the purpose/objectives of a System Safety Program?
- Why is the system safety approach followed?
- What is the cost/benefit of safety?

⁶ In the following session on solutions, there were no solutions proposed that eliminated SSPPs. The proposed solutions concerning SSPPs were all for making improvements.

Safety should be a product deliverable by the transit organization to the customers, employees, and general public. Is the existing process adequately helping safety at the agencies? The current approach was questioned by some of the participants.⁷ Are there other processes which could do better, or be used in addition to the system safety process to create safer transit?

Safety is good business - lack of safety is very expensive. A lack of information on the costs of accidents was brought out. It was felt that not only were true total costs frequently not known, but also that accurate cost information could be used to present top management with cost/benefit analyses to show the value of supporting safety.

⁷ The issue of whether or not system safety offered the best approach to achieving a safe transit operation not only questioned the value of system safety relative to other methods, but also suggested the possibility that the system safety proponents had not convinced all safety personnel of the advantages of system safety.

3. PROPOSED SOLUTIONS

3.1 DISCUSSION

During this session the workshop participants proposed and voted on solutions for the issues identified at the previous session. The following three activities took place in the Solutions Session:

1. Each of the three groups took the issues they had produced at the Issues Session and discussed possible solutions for each of them. By having participants present who represented both operators and overseers, as well as independent experts, it was possible to examine in detail the effectiveness and impacts of the suggested solutions. After each working group finalized their solutions, they were combined to produce a total of 69 proposed solutions, which were voted on by all participants. In Section 3.2, the proposed solutions are shown by category. Votes received for each of the categories are shown in Table 3-1.
2. The 69 proposed solutions were voted on by all the participants. Each participant was allowed a total of 25 votes. The intent was to assign a sense of relative importance to the various solutions. There was no pass or fail judgement intended. All of the solutions were considered worthwhile to have emerged from the individual workshop groups. In Section 3.3, the top voted solutions are discussed briefly and a complete listing of the voting results are shown in Table 3-2.
3. One of objectives of the workshop was to identify action for the proposed solutions. The intent was to identify agencies where specific actions would be initiated. The top 18 solutions were identified by the participants as sufficiently important to initiate action soon. In some cases, participants were not authorized to commit their organizations, although there was a strong sense of commitment implied by all at the workshop. The top 18 solutions and their associated action agencies are given in Section 3.4.

3.2 SUMMARY OF PROPOSED SOLUTIONS

The 69 proposed solutions involved many belonging to common groups, thus allowing the list to be divided into the same three groups used in the Issues Session, plus a miscellaneous group. Counting the proposed solutions and the votes received for each group developed a broad sense of the workshop's priority. However, the workshop procedure prevents the drawing of fine conclusions from the voting results.

Table 3-1.
Workshop Solutions by Groups⁸

Solution	No. of Solutions	No. of Votes	Group Total
Management Role			
Top management training	(7)	96	
Personal accountability	(3)	69	
Commitment to system safety	(4)	45	
Training	(6)	70	
Agency activity	(11)	74	354
System Safety Program Plan			
Contents	(11)	155	
Agency preparation	(4)	57	
User friendly	(2)	23	
Distribution/promotion	(2)	7	242
Safety Process			
System safety policy	(3)	34	
Need for better cost info	(4)	56	90
Miscellaneous			
Certification of individuals	(1)	19	
Standardize reporting	(1)	12	
Include unions	(1)	10	
Miscellaneous	(7)	41	82

The discussion from the sessions regarding the development of proposed solutions and their importance is summarized below. Two "top" groups are shown to share the necessity for improving safety.

1. Management Role

a. Top Management Training

- Need to train top executives in systems safety⁹ (#2 - 22)
- Top management must be educated on the who, what, why, where, and when of the plan (#10 - 19)

⁸ In this tabulation, "No. of Solutions" refers to the number of solutions proposed. For example, in the first entry, "Top management training," there were seven solutions proposed that called for top management systems safety training. Similarly, the column, "No. of Votes," refers to the total votes given to those eight solutions.

⁹ (#2 - 22), "#2" refers to the rank of this solution and "22" refers to the number of votes it received.

- Educate upper level management (#14 - 17)
- Need to train top executives (#26 - 13)
- Federally mandated system safety training for upper management (#30 - 12)
- MTA general chairman should mandate general manager system safety training (#51 - 7)
- APTA General Managers Seminar (voluntary) to include safety training as a regular topic (#55 - 6)

The large number of solutions and the high vote totals relating to management reflect the importance the participants placed on improving management's role in safety. In the Issues Session, it was suggested that mandatory training for management could make up for their lack of technical or operations background. In particular, training of the highest level transit management in systems safety was given a high priority in the workshop voting. Reflecting time pressure on chief executives for such training, the participants suggested short seminars using peer training for CEO's.

b. Management Commitment to System Safety

- Top management must own and support the plan with active and enforceable policy statements (#4 - 21)
- Make the plan important to top management - get their commitment (#42 - 10)
- Motivation must be continued through the involvement of the MTA and its board (#49 - 8)
- Insure top-level commitment (#52 - 6)

The importance of top management's strongly articulated commitment to system safety was emphasized in the voting. The participants felt that top management commitment is essential and that the most important step for achieving such commitment is improving the system safety awareness of top management.

c. Personal Accountability

- After training, establish management accountability for safety performance through the performance evaluation process (#1 - 27)
- Safety performance should be included in performance (#3 - 22)
- CEO must establish a performance review process for accountability among management (#6 - 20)

Individual accountability for failure of safety was supported in the voting, including at the top management level. Steps to create accountability included: (1) defining safety responsibility clearly in job descriptions, (2) establishing penalties for each individual's failure to meet that responsibility (penalties should be clearly stated), and (3) requiring that everyone be accountable for their safety performance at the time of job performance reviews.

d. Training for Other Than Top Management

- Need to train mid and lower level managers (#11 - 17)
- Safety must be integrated into all training programs (#16 - 16)
- System training for all employees, especially managers at all levels (#19 - 15)
- Forming standard modules for managers (#43 - 9)
- Employees should be trained for their responsibility for accident prevention and rules compliance (#45 - 9)
- Conduct site specific seminars (#60 - 4)

This grouping indicates a need for more training, particularly in system safety, for all levels of employees. However, in addition to the top-level management training noted above, the participants also indicated that mid-level management training should be emphasized. Responsibility for training was felt to be with both the agencies and the FTA.¹⁰

e. Agency Activity

- Have executive management require participation of the affected departments in the safety process (#34 - 11)
- Ensure policies and procedures affecting safety require safety department participation (#35 - 11)
- Ensure participation by other departments within the agencies as part of the audit process (#41 - 10)
- Ensure adequate number of qualified staff (#47 - 8)
- Establish a safety motivation program (#50 - 8)
- Increase communication channels through all levels of the agency (#54 - 6)
- Day-to-day monitoring of properties, including performing safety audits (#56 - 6)
- Programs within the organization to share safety information (#59 - 4)
- Promotion campaign to raise awareness regarding safety (#62 - 4)
- Transit agencies should routinely perform self audits (#63 - 3)
- Incentive program within organization (#64 - 3)

¹⁰ The need for more training shows confidence in and justification of the training programs offered by the operating agencies and by the Transportation Safety Institute under FTA sponsorship. The participants indicated that these programs should be accelerated to include more of the employees.

This group of solutions addresses those actions (other than training) which could be implemented by agency management.

2. System Safety Program Plan (SSPP)

a. Contents

- Develop national criteria for system safety plans from which detailed agency-specific plans can be evaluated (#5 - 21)
- SSPP must be written in such a way as to be of value to all management/supervisory personnel (#8 - 19)
- The contents of the plan should go beyond the PTSTB guidelines to incorporate all its safety needs (#9 - 19)
- Should be greater flexibility within system safety program elements (#12 - 17)
- Develop and implement performance standards within the plan (#17 - 16)
- The format of the plan should reflect the day to day operations of the transit agency thereby making it user friendly (#18 - 16)
- Allow for generic guidelines across the country (#24 - 13)
- SSPP should be a coordinating document that tells where to find details pertaining to particular topics (in appendices or references) (#37 - 11)
- Each section of the plan should be able to stand alone enabling each department to be familiar with its responsibilities (#38 - 11)
- Address all aspects of safety being performed within the agency (#46 - 8)
- Put dynamic elements as appendices, e.g. rules, procedures and system description/history (#57 - 4)

The content of the SSPP was given considerable attention and it was suggested that the SSPP be more "custom built" for each agency. Although specific features of such an SSPP were not described, the participants from the transit agencies wanted to make their SSPPs more responsive to their own transit agency's particular characteristics.

b. Agency Preparation

- Have a cooperative development of the plan so that everyone buys into it (#13 - 17)
- The plan must have input from all departments (#20 - 15)
- Give department heads the responsibility to write their own organization, their safety role/responsibilities (#22 - 14)
- Allow the NYCTA to be a pilot program by allowing incremental development of the SSPP with the end result being a successful model that can be applied to all agencies and meet all needs (#33 - 11)

This group of proposed solutions shows a strong need for input to the SSPP from the entire transit agency.¹¹

The proposal to allow the NYCTA to perform incremental preparation of its SSPP over a period of time was introduced by NYCTA participants and caused considerable discussion. Their argument was that the NYCTA is so large that the effort to produce an effective SSPP within one year would absorb an unacceptable amount of the safety department's resources. Difficulties with such an arrangement are associated with material becoming outdated.

c. User Friendly

- Plan must be written so that it is useful to the reader - a workbook (#29 - 12)
- Easy to distribute and user friendly (#36 - 11)

Making the information contained in the SSPP more accessible was considered an important change. There was no opposition.

d. Distribution/Promotion

- Insure that plan is controlled document (#58 - 4)
- Establish a comprehensive controlled document distribution list (#66 - 4)

Distribution is important to insure the intent of the SSPP is fulfilled.

3. Safety Process

a. System Safety Policy

- Borrow ideas from private industry with successful safety records to incorporate into system safety programs and plans (#23 - 13)
- Examine other system safety processes outside the transit industry (#32 - 11)
- Examine other safety processes for possible inclusion, is system safety the way to go? (#39 - 10)

While the basic philosophy of system safety came under discussion, the tone of the workshop was to insure that the best possible safety approach be used. Participants suggested that other safety processes be examined for possible inclusion in transit safety.

b. Need for Better Cost Information

- Develop analytical reports to demonstrate the benefit-cost ratio of safety (#15 - 17)
- Train executive staff on the cost-benefits of the program (#21 - 14)

¹¹ This group of solutions presents a need for all parts of the agency to contribute to the SSPP. Implied in these solutions is the realization that outside of the safety departments there is little or no recognition given to the SSPP.

- Perform and develop cost-benefit analysis as part of the System Safety Program with continuous update (#25 - 13)
- Agencies must develop criteria for determining true costs for accidents (#31 - 12)

Although there was little prior indication from both the Section 22 investigation and discussions before the workshop, the participants thought more attention was needed to determine the full cost of accidents and to communicate the cost-benefit of safety with top management in order to justify and increase the role of system safety in transit.

4. Miscellaneous

- Develop a program for certification of safety professionals (#7 - 19)
- Standardize the reporting process that is acceptable to all agencies (#28 - 12)
- Unions must be included in the safety process and become part of the solution (#41 - 10)
- Public awareness program (#44 - 9)
- Perform accident trend analysis (#48 - 8)
- Include accident rates as accident indicators (#53 - 6)
- Conduct site-specific seminars (#60 - 4)
- Include in FTA triennial review a system safety module (#61 - 4)
- Include in FTA project management oversight process a system safety module (#65 - 3)
- Regular safety performance reports (#67 - 3)
- Colorful brochure for a selling campaign (#68 - 2)
- SSPP needs to be continually promoted in a positive manner (#69 - 2)

This group of solutions included a variety of approaches to improve transit safety. The first several in the voting should be noted. Certifying safety professionals has been suggested in the state oversight mandated by legislation and was given strong support in the workshop. Other noteworthy proposals included developing standardized reporting and including unions in the drive for improved safety. Analyses of performance and accident/incident records to indicate trends was also supported.

3.3 IDENTIFICATION OF PROPOSED SOLUTIONS

This section gives a listing of the proposed solutions in the order in which they were voted by the participants.¹² The rank order of the voting for the complete list of proposed solutions is

¹² While the individual vote count for the proposed solutions shows a measure of priority, readers are urged to review the complete listing of solutions as details important to individual readers may be buried in the summarization of this document.

shown in Table 3-2. Comments are shown below for the individual solutions receiving the top votes.

No. 1 (27 votes) *After training, establish management accountability for safety performance through the performance evaluation process*

This proposed solution combined several of the issues which had been given strong support throughout the workshop: (1) accountability for safety performance, (2) involvement of management, and (3) the need for top management training. This particular solution was supported by many of the participants.

No. 2 (22 votes) *Need to train top executives*

The number two vote winner was a subset of number one and reinforced the need for top executive training.

No. 3 (22 votes) *Safety performance should be included in performance*

As in number two, number three reflected the top vote receiver and indicated the need for personal accountability in safety. Furthermore, it showed one way of creating accountability - by including safety performance in annual personnel reviews.

No. 4 (21 votes) *Top management must own and support the plan with active and enforceable policy statements*

This proposed solution, which was fourth in votes, indicated one specific action for top management in their proactive safety role - they should show direct support for the System Safety Program Plan. This proposed solution went further by designating that top management must sign for the plan.

No. 5 (21 votes) *Develop a national criteria for system safety plans from which detailed agency-specific plans can be evaluated*

The fifth ranked solution supported the concept of the plans being more directly related to the conditions and needs of each operating agency.

These top five vote receivers mirrored the two main themes from much of this workshop:

- Top management must be knowledgeable, proactive, and responsible
- System Safety Program Plans should reflect the specific conditions at each agency

Table 3-2, below, lists the 69 solutions in the order of the votes received.

Table 3-2 . Solution Votes for All Groups

Rank	Proposed Solution	Votes
1	After training, establish management accountability for safety performance through the performance evaluation process	27
2	Need to train top executives	22
3	Safety performance should be included in performance	22
4	Top management must own and support the plan with active and enforceable policy statements	21
5	Develop national criteria for System Safety Plans from which detailed agency-specific plans can be developed	21
6	CEO must establish a performance review process for accountability among management	20
7	Develop a program for certification of transit safety professionals	19
8	SSPP must be written in such a way as to be of value to all management/supervisory personnel	19
9	The contents of the plan should go beyond the PTSB guidelines to incorporate all its safety needs	19
10	Top management must be educated on the who, what, why, where and when of the plan	19
11	Need to train mid and lower level managers	17
12	Should be greater flexibility within system safety program elements	17
13	Have a cooperative development of the plan so that everyone buys into it	17
14	Educate upper level management	17
15	Develop analytical reports to demonstrate the benefit cost ratio of safety	17
16	Safety must be integrated into all training programs	16
17	Develop and implement performance standards within the plan	16
18	The format of the plan should reflect the day to day operations of the transit systems thereby making it user friendly	16
19	System safety training for all employees, especially managers at all levels	15

Table 3-2. Solution Votes for All Groups (cont.)

Rank	Proposed Solution	Votes
20	The plan must have input from all departments	15
21	Train executive staff on the (cost) benefits of the program	14
22	Give department heads the responsibility to develop and write for their own organization, their safety role/ responsibilities	14
23	Borrow ideas from private industry with successful safety records to incorporate into system safety programs and plans	13
24	Allow for generic guidelines across the country	13
25	Perform and develop cost benefit analysis as part of system safety program with continuous update	13
26	Need to train top executives	13
27	Safety component should be part of job description	13
28	Standardize the reporting process that is acceptable to all agencies	12
29	Plan must be written in fashion so that it is useful to the reader (workbook)	12
30	Federally mandated System Safety training for upper management	12
31	Agencies must develop criteria for determining true costs for accidents	12
32	Examine other system safety processes outside of the transit industry	11
33	Allow NYCTA to be a pilot program by allowing incremental development of the SSPP with the end result being a successful model that can be applied to all agencies and meet all needs	11
34	Have executive management require participation of affected departments in the safety process	11
35	Ensure policies and procedures affecting safety require safety department participation	11
36	Easy to distribute and user friendly	11
37	SSPP should be a coordinating document that tells where to find details pertaining to particular topics (in appendices or references)	11

Table 3-2. Solution Votes for All Groups (cont.)

Rank	Proposed Solution	Votes
38	Each section of the plan should be able to stand alone enabling each department to be familiar with its responsibilities	11
39	Examine other safety processes for possible inclusion, is system safety the way to go	10
40	Ensure participation by other departments within the agencies as part of the audit process	10
41	Unions must be included in the safety process and become part of the solution	10
42	Make the plan important to top management - get their commitment	10
43	Forming standard training modules for managers	9
44	Public awareness program	9
45	Employees should be trained for their responsibility for accident prevention and rules compliance	9
46	Address all aspects of safety being performed within the agency	8
47	Ensure adequate number of qualified staff	8
48	Perform accident trend analysis	8
49	Motivation must be continued through the involvement of the MTA and its board	8
50	Establish safety motivation program	8
51	MTA general chairman should mandate general manager System Safety training	7
52	Insure top level commitment	6
53	Include accident rates as performance factors	6
54	Increase communication channels through all levels of the agency	6
55	APTA General Managers Seminar (voluntary) to include safety training as a regular topic	6
56	Day-to-day monitoring of properties, including performing safety audits	6
57	Put dynamic elements as appendices (e.g., rules, procedures, and system description/history)	4
58	Insure that plan is a controlled document	4

Table 3-2. Solution Votes for All Groups (cont.)

Rank	Proposed Solution	Votes
59	Programs within the organization to share safety information	4
60	Conduct site-specific seminars	4
61	Include in FTA triennial review a system safety module	4
62	Promotion campaign to raise awareness concerning safety	4
63	Transit agencies should routinely perform self-audits	4
64	Incentive programs within organization	3
65	Include in FTA project mgt. oversight (PMO) process a system safety module	3
66	Establish a comprehensive controlled document distribution list	3
67	Regular safety performance reports	3
68	Colorful brochure for a selling campaign	2
69	SSPP needs to be continually promoted in a positive manner	2

3.4 SUGGESTED ACTION

One of the objectives of the workshop was to identify actions for the proposed solutions. The intent was to identify agencies where specific actions would be initiated.¹³ The top 18 solutions in Table 3-2 were identified as sufficiently important to warrant immediate action. In some cases, participants were not authorized to commit their organizations, although there was a strong sense of commitment implied by all at the workshop. Correspondence after the workshop relating to actions is shown in Appendix C. Shown below are the suggested actions for the solutions, listed by agency and solution number. Identifying agencies with the specific solutions reinforces the need for the proposed solutions to be further developed and implemented.

Federal Transit Administration

- Need to train top executives (FTA/Volpe Center) (#2 - 22)
- Develop a national criteria for system safety plans from which detailed agency-specific plans can be evaluated (#5 - 21)
- Allow for generic guidelines across the country (FTA) (#24 - 13)
- Develop a program for certification of safety professionals (FTA-and coordinate with PTSTB/APTA/MTA/Property) (#7 - 19)
- Examine other system safety processes outside the transit industry (FTA establish a task force) (#32 - 11)
- Examine other safety processes for possible inclusion, is system safety the way to go? (FTA establish a task force) (#39 - 10)
- Federally mandated system safety training for upper management (FTA/PTSTB/MTA/Property) (#30 - 12)
- Forming standard modules for managers (FTA/Volpe) (#43 - 9)
- Perform accident trend analysis (FTA/PTSTB/Agency) (#48 - 8)
- Conduct site-specific seminars (FTA/MTA) (#60 - 4)
- Include in FTA triennial review a system safety module (FTA) (#61 - 4)
- Include in FTA project management oversight (PMO) process a system safety module (FTA) (#65 - 3)

Volpe Center (VNTSC) (the John A. Volpe National Transportation Systems Center performs transit research and program support under direct control of the FTA)

- Need to train top executives (FTA/Volpe Center) (#2 - 22)
- Need to train mid and lower level managers-FTA and locals (Volpe and Transit Agencies) (#11 - 17)
- Forming standard modules for managers (FTA/Volpe) (#43 - 9)

¹³ Identification of the individual authority associated with each proposed solution was taken directly from the names on the voting list. In addition, where no responsible authority was shown, but the authority was obvious, identification was included.

New York State Public Transportation Safety Board (PTSB)

- Federally mandated system safety training for upper management (FTA/PTSB/MTA/Property) (#30 - 12)
- Develop a program for certification of safety professionals (FTA-and coordinate with PTSB/APTA/MTA/Property) (#7 - 19)
- Should be greater flexibility within system safety program elements (PTSB) (#12 - 17)
- Develop and implement performance standards within the plan (MTA/Agencies/PTSB) (#17 - 16)
- Allow the NYCTA to be a pilot program by allowing incremental development of the SSPP with the end result being a successful model that can be applied to all agencies and meets all needs (NYCTA/MTA/PTSB) (#33 - 11)
- Address all aspects of safety being performed within the agency. (Agencies/PTSB) (#46 - 8)
- Perform accident trend analysis (FTA/PTSB/Agency) (#48 - 8)
- Put dynamic elements as appendices, e.g. rules, procedures and system description/history. (Agencies/PTSB) (#57 - 4)

Metropolitan Transportation Authority (MTA)

- Top management must be educated on the who, what, why, where, and when of the plan (#10 - 19)
- Educate upper level management (MTA/Properties) (#14 - 17)
- Federally mandated system safety training for upper management (FTA/PTSB/MTA/Property) (#30 - 12)
- MTA general chairman should mandate general manager system safety training (#51 - 7)

Properties

- Federally mandated system safety training for upper management (FTA/PTSB/MTA/Property) (#30 - 12)
- SSPP must be written in such a way as to be of value to all management/supervisory personnel (Property) (#8 - 19)
- The contents of the plan should go beyond the PTSB guidelines to incorporate all its safety needs (Property) (#9 - 19)
- Develop a program for certification of safety professionals (FTA-and coordinate with PTSB/APTA/MTA/Property) (#7 - 19)
- Perform accident trend analysis (FTA/PTSB/Agency) (#48 - 8)
- Address all aspects of safety being performed within the agency (Agencies/PTSB) (#46 - 8)
- Put dynamic elements as appendices, e.g. rules, procedures and system description/history (Agencies/PTSB) (#57 - 4)

Miscellaneous

American Public Transit Association (APTA)

- Develop a program for certification of safety professionals (FTA-and coordinate with PTSB/APTA/MTA/Property) (#7 - 19)
- APTA General Managers Seminar (voluntary) to include safety training as a regular topic (APTA Safety Committees) (#55 - 6)

Union

- Unions must be included in the safety process and become part of the solution (Property/Union Management) (#41 - 10)

4. CONCLUSIONS

Two observations from the workshop were that the system safety concept is strong and that the System Safety Program Plan is supported. And, as a result of the changes in the plan and its implementation, as discussed at the workshop, it would become an integral part of an agency's safety activity.

The following workshop conclusions were based on the session discussions and solutions:

1. The system safety concept is supported by this workshop as the best means to achieve the highest level of safety that is practical. It provides a framework for implementing many of the proposed solutions of this workshop and for achieving the goal of safety.
2. Identified issues and proposed solutions for improving system safety and its implementation center around two areas. Both are considered necessary because safety requires both. Essential are: 1) a safety plan that meets the requirements of oversight and the features of each transit agency; and 2) the vigorous implementation of the plan.
3. The System Safety Program Plan is necessary for implementing system safety and it must meet the specific characteristics of each agency. The plan should be promoted by top management, be contributed to and designed for all management, and include all safety activities.
4. Strong top management support for implementation of system safety within the transit agencies is essential. This includes CEOs and presidents. To meet this end, the workshop stated that top management training in highly focused training sessions on system safety concepts is necessary.
5. Training at all levels in system safety and in job related safety responsibilities should also be increased. Such training could establish the basis for safety accountability.
6. Personal accountability for safety failures is a necessary addition to individual performance records. Everyone in a transit agency should be included.
7. There are safety related efforts which transit agencies can introduce to improve safety in the areas of training, assigning responsibility, and internal communication.
8. There is a need for better cost accounting of all aspects of accidents and safety.

Throughout the workshop, in formal sessions and in informal discussions, it became exceedingly apparent that to create safety at its highest practical level, it is necessary to have an effective SSPP which meets the requirements of both the operating agency and its oversight body. The participants did suggest that new concepts in the field of safety be examined to see if they could be made part of the SSPP and contribute to system safety. Receiving considerable participant agreement were the proposals for personal accountability

for safety. This is an approach being adopted in some private industrial companies. There was a strong message from the participants that safety accountability from the top down is needed; and to insure accountability, safety performance should be part of each individual's performance review.

Throughout the workshop, the participants voiced their enthusiasm for the opportunity to examine common problem areas and propose solutions with people from other organizations.

APPENDIX A. ORGANIZATION OF WORKSHOP

**A WORKSHOP
ON
EXPLORING HOW TO MAKE SYSTEM SAFETY WORK IN TRANSIT**

SEPTEMBER 21-22, 1993

**New York City Transit Authority, Human Resources Building
1250 Broadway, Manhattan**

Workshop Goal: Develop a workable system safety process that meets the needs of the
NYMTA transit systems and the PTSB.

Tuesday, September 21, 1993

8:30 - 8:35	Welcoming Remarks from NYCTA	Bianco
8:35 - 9:00	Welcoming Remarks from PTSB and MTA	Plasberg/ Kleinbaum
9:00 - 9:15	Workshop Goals and Objectives	Kangas
9:15 - 9:45	Overview of FTA System Safety Findings	Kangas
9:45 - 10:00	Break and Adjourn to Working Groups	
10:00 - 12:00	Concurrent Workshop Groups: Identify and Define the Issues that Require Resolution to Attainment the Workshop Goal?	
12:00 - 1:30	Lunch	
1:30 - 2:00	Presentation of Specific Issues	Wrkshp Chairs Defined in Working Groups
2:00 - 2:15	Break and Adjourn to Working Groups	
2:45 - 5:00	Concurrent Workshop Groups: Identify the Solutions and Actions Required to Address the Identified Issues?	

Wednesday, September 22, 1993

- | | |
|---------------|---|
| 9:00 - 10:00 | Presentation of Solutions and Required Wrkshp Chairs
Actions Defined in Working Groups |
| 10:00 - 10:15 | Break and Adjourn to Working Groups |
| 10:15 - 12:00 | Concurrent Workshop Groups: Group Discussion and Ranking of
Solutions and What Actions, If any are needed? |
| 12:00 - 1:00 | Lunch |
| 1:00 - 2:00 | Presentation of Ranking and Summary L. Kleinbaum |

NEW YORK SYSTEM SAFETY WORKSHOP
LIST OF ATTENDEES
September 21-22, 1993

Steve Faust-FTA
Roy Field-FTA
Ron Kangas-FTA

Bill Dayton-PTSB
John Fabian-PTSB
Desi Lawe-PTSB
Edward Plasberg-PTSB
Jude Ryan-PTSB
Jerry Schook-PTSB

Linda Kleinbaum-MTA
Judy Walker-MTA

Arthur Basley-NYCTA
Carmen Bianco-NYCTA
Cheryl Kennedy-NYCTA
Jim Wincek-NYCTA
Neil Yongue-NYCTA

Jim Griffin-MNCR
Bill Mahoney-MNCR

Jim Dermody-LIRR
Jose Fernandez-LIRR
Don Teague-LIRR

Peggy Connelly-MSBA

Peggy Brouse-George Mason Univ. (GMU)
Ann Fields-GMU
Jeannie Robinson-GMU

Vita Covington-PPTN
Kathy Davis-PPTN
Dorothy MacDorman-PPTN

Mike Dinning-Volpe
Bill Hathaway-Volpe
Dave Knapton-Volpe
Liz McGrath-Volpe

Don Dzinski-Kaiser
Harv Hunt-Kaiser

Susan Gilbert-IEI

George Pastor-PAI

Paul Lennon-APTA

Jerry Schulman-BAH

David Wilson-DuPont

APPENDIX B. TABULATION OF IDENTIFIED ISSUES

Blue Team Issues

Blue Team Issues After Organizing

What is the purpose/objectives of a system safety program/plan and who is it for?
The plan should be a framework for safety.

1. Need a comprehensive plan to promote safety
 - 1.1 For customers - i.e., passengers, employees, and the general public
 - 1.2 Safety plan is for the entire transit system
2. System safety should be a top down process
 - 2.1 Parallel to good management plan
 - 2.2 Need sufficient participation to assure that all elements buy into the program
3. Accountability/responsibility for Safety is everybody's business
 - 3.1 Responsibilities for interfacing and coordination
 - 3.2 Communications tool for understanding and awareness
 - 3.3 Coordination is a most important part of communication and accountability
4. Safety should be a deliverable product by the transit organization to customers - passengers, employees, and the general public
 - 4.1 Safety is good business - lack of safety is very expensive
5. SSPP should be written by and for the transit organization, reflecting the organization's objectives (not solely satisfying an audit function)
 - 5.1 The plan must state what the agency intends to implement in its program
 - 5.2 The plan needs to include realistic/achievable goals
 - 5.3 The plan must be all inclusive and formally document how to implement the stated goals

Blue Team Issues

- 5.4 A SSPP should contain, as a minimum, interface information that lays out responsibility, accountability, for all potentially affected depts. and should outline the hazard identification and resolution process.

6. Comments:

- 6.1 Need flexibility with plan development
- 6.2 Having plan does not necessarily mean you have a program
- 6.3 Executive summary of the system safety program plan - separated into two levels- philosophy and mission; detail and operation
- 6.4 Security is an intentional act; safety addresses accidental acts
- 6.5 Lack of safety is a hazard
- 6.6 Security issues should be separate workshop
- 6.7 PTSB guidelines set up to interface only concerned with the Public - no dictate that cannot be concerned with environmental issues
- 6.8 PTSB has no mandate to be involved with environmental and OSHA type issues
- 6.9 APTA guidelines are much greater than PTSB
- 6.10 Organizations are trying to conform to PTSB instead of the necessary safety problems
- 6.11 PTSB gave some basics to guidelines for safety - everyone could still add their particulars
- 6.12 Organizations are concerned about audits because of being public agency
- 6.13 Current guidelines are too generic
- 6.14 Audit checklist turned into guideline
- 6.15 APTA doc. is only doc. with specific guidelines concerning safety applications
- 6.16 Many issues deal with security and not everyone has security force

7. Problems:

- 7.1 Largeness is problem
- 7.2 People think in limited scope
 - 7.2.1 Com: Bus don't fit lifts
- 7.3 Incorrect perception is that safety is solely the safety dept. business
- 7.4 Currently begins and ends in safety dept.

Blue Team Issues

- 7.5 Conflicting goals; time constraints, budget
 - 7.6 Upper level mgt. education - Very top mgt.
 - 7.7 Resentment in implementing some safety requirements
 - 7.8 Safety perceived to be detrimental to operation
 - 7.9 Security is important part of safety - or is it the Police Dept.'s job?
 - 7.10 Reverse incentives - operators being paid for retraining and filling out accident reports
 - 7.11 FELA process encourages the injury claim process
 - 7.12 Another neg. incentive is decreased budget if increase in safety
 - 7.13 Can't put every detail because the plan becomes too detailed and cumbersome
8. Potential items for "solutions" discussion:
- 8.1 The plan should have an executive policy statement, which should be simple, concise, short to give people an idea of responsibility - it should be followed by a detailed implementation plan
 - 8.2 i.e., time frames to develop plan, more details of the particular topics, etc.
 - 8.3 Comment: System Safety Program Plan (SSPP) should be one small document that tells where to find details pertaining to particular problem

Green Team Issues

Green Team Issues After Organizing

1. Why are we doing it - Policy?
2. What is the purpose/objectives of a system safety program?
 - 2.1 Commitment by top management to use the plan
 - 2.2 No ownership/empowerment of plan
 - 2.3 Should it be proactive program vs. reactive program
 - 2.4 A fundamental vision endorsed by top management
 - 2.5 Define basic principles
 - 2.6 Establishing responsibilities/accountability
3. Lack of safety awareness by management
 - 3.1 Safety is a condition of employment
 - 3.2 Must communicate to all levels
 - 3.3 Must be flexible
 - 3.4 Need create corporate safety consciousness
 - 3.5 Must create a corporate safety culture
4. What is the cost benefit of safety?
5. Who is it for?
 - 5.1 Should plan be concerned with public and/or employee safety
 - 5.2 Should it address the concerns of oversight agencies
6. Development of the plan
 - 6.1 Plan must assist individuals in transit authority do their job
 - 6.2 Who develops the format for the plan
 - 6.3 What are the elements of the plan
 - 6.3.1 Reduce to a manageable size
 - 6.3.2 Standard operating procedures developed
 - 6.4 Use as a management tool should address the concerns of oversight agencies

Green Team Issues

- 6.5 Should the plan document what is being done or develop a plan that documents what we ought to be doing - Iterative process
- 6.6 Why is there a description of the system
- 6.7 Reduction of accidents part of performance reviews
- 6.8 Is it possible to develop a generic plan
 - 6.8.1 Rigidity of documents
 - 6.8.2 Must represent the culture and each individual organization
- 7. Maintenance of the plan
 - 7.1 Testing the plan
 - 7.2 Auditing results in revisions
 - 7.3 How to make/implement revisions and changes to safety plan
 - 7.4 Who is responsible for making/implementing plan revisions?
- 8. Communication
 - 8.1 Word is not getting out
 - 8.2 Not sufficient resources given for implementation of plan
 - 8.3 Top management do not understand beyond the mission statement what system safety is
 - 8.4 Need a document that all levels of users can/will utilize
- 9. System safety is out there but the focus is on preparing the document and training of personnel
- 10. Implementation
 - 10.1 Auditing
 - 10.2 Monitored performance of system
 - 10.3 Should be a self guidance tool
 - 10.4 Oversight is part of implementation
 - 10.5 Rewards and recognition
- 11. Is there another safety process?
 - 11.1 Regulatory process
 - 11.2 Responsibility process
 - 11.3 Ownership/accountable process

Green Team Issues

- 11.4 Companies don't have corporate plans but have guidelines
- 11.5 Principles are set and structure should follow
- 11.6 Interactive process

Red Team Issues

Red Team Issues After Organizing

1. Management Commitment

- 1.1 Lack of continual top management safety support and safety accountability due in part to:
 - 1.1.1 Managers in transit agencies don't understand the system safety concept and philosophy
 - 1.1.2 Lack of system safety training and experience
 - 1.1.3 The safety department lacks the resources, authority, and corporate support to effectively develop, implement and evaluate safety program
 - 1.1.4 Not effectively utilizing departments within authority

2. The SSPP

- 2.1 The process is not adequately helping improve safety at the agencies
- 2.2 The true potential of the plan is not being realized due in part to:
 - 2.2.1 SSPP should be for the agency
 - 2.2.2 Document has been developed and used to comply with state regulations only
 - 2.2.3 PTSB guidelines are cumbersome; written for auditing process
 - 2.2.3.1 Not well understood, poorly put together not very helpful
 - 2.2.3.2 Format is too structured and detailed to incorporate in a transit agency - not a workable document
 - 2.2.4 Program should help all the managers understand system safety
 - 2.2.5 Perception of users that plan does not have payback and worth to the employees
 - 2.2.6 More difficult to apply this philosophy to a system with equipment that is aged, not state of the art
 - 2.2.6.1 Trying to apply safety standards to a large, complex, old, and changing system
 - 2.2.7 PTSB guidelines do not include all aspects of safety - currently passenger oriented, small portion of what a safety program is supposed to be

Red Team Issues

- 2.2.8 Writing the plan to fit the operations, not what it ideally should be
 - 2.2.8.1 Plan needs to also fit strategic business plan
- 2.2.9 There are no performance indicators for the plan
 - 2.2.9.1 Should be included in the plan
 - 2.2.9.2 The plan should be used as a tool for accident reduction
- 2.2.10 Perception of users that plan does not have payback and worth to the employees
- 2.2.11 The safety department lacks the resources, authority, and corporate support to effectively implement a safety program
 - 2.2.11.1 Not effectively involving departments within the authority
- 2.2.12 Jargon associated with system safety is not well defined - difficult to understand
 - 2.2.12.1 Program and plan are two different things
- 2.2.13 Is the plan truly inflexible, or is that a perception

3. Training

- 3.1 Training is an issue for all employees, especially managers at all levels
- 3.2 All employees, including line supervisors and managers at all levels don't have a sense of what their everyday responsibility to system safety

4. Implementation

- 4.1 Process is not adequately helping improve safety at the authority
- 4.2 Program should help all the managers understand system safety
- 4.3 Need a common sense approach to make it a part of everyday responsibilities
 - 4.3.1 An important part of their regular duties
- 4.4 Inadequate information dissemination of plans
- 4.5 Dealing within a large operating environment
 - 4.5.1 Trying to apply safety standards to a large, complex, old, and changing system
- 4.6 The safety department lacks the resources, authority, and corporate support to effectively implement a safety program
 - 4.6.1 Not effectively involving departments within authority

Red Team Issues

- 4.7 Inadequate policies and procedures to effectively support the system safety program
- 4.8 There is more than one agency to report to (i.e. PTSB and FRA)
 - 4.8.1 Standardized the reporting process



APPENDIX C. POST WORKSHOP CORRESPONDENCE AND ACTION

RECEIVED

1993 OCT 03 PM 10:40

347 Madison Avenue
New York, NY 10017-3739
Telephone: 212 878-7000

RECEIVED IN TES
1993 OCT 04 PM 1:42

September 30, 1993

Mr. Gordon J. Linton
Administrator
Federal Transit Administration
400 Seventh St., SW
Washington, D.C. 20590

Dear Mr. Linton:

I want to thank you and your staff for your assistance in sponsoring the very successful workshop on System Safety Program Plans (SSPP's) that was held in New York on September 21 and 22. The workshop, prompted by the findings of the FTA safety investigation which found shortcomings in the SSPP's prepared for the Public Transportation Safety Board (PTSB), focussed on the development and effective implementation of SSPP's. Representatives of FTA, FRA, the Volpe Center, the New York State Public Transportation Safety Board (PTSB), MTA and its operating agencies, as well as some of the nation's top consultants in this field participated in the workshop.

I understand that the workshop was a terrific success, with consensus reached on those actions most important to developing meaningful safety plans. Two principal recommendations are of particular note to our two agencies given the findings of the FTA safety investigation. The first recommends that the PTSB allow the transit agencies it oversees in New York State greater flexibility in development of their SSPP's. It was agreed that the MTA family along with FTA will follow up with the PTSB to insure that the plan development process is revised in a way that will allow New York State agencies the ability to develop SSPP's that will embody a real action plan for safety. I foresee these plans developing much like MSBA's new plan, with guidance from FTA, and the cooperation of PTSB and input from all departments of the agencies.

The second recommendation called for improved or additional training of top management at the MTA agencies. The members of the workshop recommended that FTA extend its training program to top level management, either funding such training through a consultant who currently has such a curriculum or by developing such a training program itself. I would welcome such assistance from FTA.

Members of the Board

Peter E. Stangl
*Chairman and
Chief Executive Officer*

Daniel T. Scannell
First Vice Chairman

Lilyan H. Affinito
Bernard B. Beal
E. Virgil Conway
Warren S. Dolny
Barry Feinstein

Barbara J. Fife
Prema Mathai-Davis
Neil Novesky
Lucius J. Riccio
Joan Spence

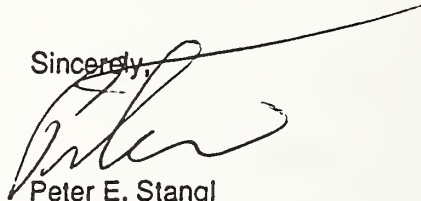
Edward A. Vrooman
Alfred E. Werner

Gordon J. Linton
Federal Transit Administration
September 30, 1993

Page 2

I believe that in working together on these two issues, we can establish a model for improving safety not only on the MTA properties but on transit systems throughout the nation. I look forward to your assistance in this effort.

Sincerely,

A handwritten signature in black ink, appearing to read "Peter E. Stangl", with a long horizontal line extending from the end of the signature.

Peter E. Stangl
Chairman and
Chief Executive Officer

cc: C. Hoppe
A. Kiepper
D. Nelson
H. Williams



U.S. Department
of Transportation

**Federal Transit
Administration**

The Administrator

400 Seventh St., S.W.
Washington, D.C. 20590

DEC 21 1993

Mr. Peter Stangl
Chairman and Chief Executive Officer
Metropolitan Transportation Authority
347 Madison Avenue
New York, New York 10017-3739

Dear Mr. Stangl:

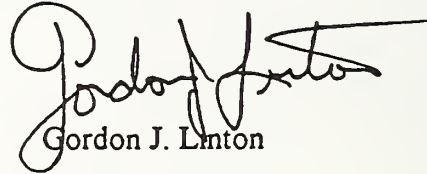
I want to take this opportunity to thank you for the outstanding efforts of you and your staff in preparing the Implementation Plans for the Metropolitan Transportation Authority (MTA) and each of the operating authorities. The level of expertise and dedication of the MTA is clearly reflected in the comprehensive nature and responsiveness of the Plans. We have noted in our review of the MTA plan that you have taken the initial step by providing a policy which expresses the MTA's commitment to safety, and endorses the adoption of the system safety concept in the MTA and its operating elements. This need for management commitment was the top ranked action identified at the recent workshop in New York on "Exploring How To Make System Safety Work In Transit." With this policy and the information provided in the Plans, we are approving the Implementation Plans dated August 1993. We note that a number of actions have been successfully completed, and are therefore considered closed. We also are informing you that all of the Federal Railroad Administration findings have been successfully resolved and are considered closed.

The Federal Transit Administration (FTA) Region II staff will work with your staff in monitoring the implementation of the Plans. We expect that your own internal auditing of the identified corrective actions will assist the FTA in determining which actions are closed and when.

I appreciate your recent letter commending the FTA on the success of the recent workshop in New York on System Safety. We believe that the agreements reached on System Safety, once implemented, fully satisfy the issues raised during the recent Section 22 investigation. FTA supports the need for top level management safety training and believes that one approach for obtaining that training is through the National Transit Institute (NTI) at Rutgers. NTI would have the ability to establish such a course, if it could be designed with an industry-wide audience in mind. Since you are on the board of the NTI, a direct request from you identifying the need for such training could get the course initiated. Furthermore, we believe that such an action would provide a very meaningful leadership role for the MTA that would have industry-wide value.

If you require any further clarification or additional information, please do not hesitate to contact Ronald Kangas of my staff on (202) 366-0212.

Sincerely,

A handwritten signature in black ink, appearing to read "Gordon J. Linton", with a stylized flourish extending from the end of the name.

Gordon J. Linton

347 Madison Avenue
New York, NY 10017-3739
Telephone: 212 878-7000

Post-It™ brand fax transmittal memo 7671 # of pages >	
To <i>Ron Kangas</i>	From <i>Linda Kleinbaum</i>
Co. <i>ETA</i>	Co.
Dept.	Phone # <i>212-878-7206</i>
Fax # <i>366-3765</i>	Fax #

January 26, 1994

Mr. Gordon J. Linton
Administrator
Federal Transit Administration
400 Seventh St. S.W.
Washington, D.C. 20590

Dear Mr. Linton:

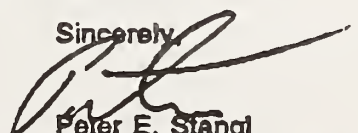
Thank you for your recent letter approving the MTA Implementation Plans to the FTA Safety Investigation. As you know, I have a strong personal commitment to make our system as safe as possible and I appreciate your recognition of the comprehensive nature and responsiveness of these plans. I believe we have assembled many of the top safety experts in the country on our staff whose expertise is, as you point out, clearly demonstrated in these safety action plans. The MTA family saw this effort as an excellent opportunity to enhance the safety of our system and strove to make these implementation plans a blueprint to do just that.

The high quality of these plans also reflects the expertise and dedication of the FTA staff who managed this effort. Ron Kangas' coordination of this effort, with the assistance of William Hathaway of the National Transportation Center (NTSC), resulted in the development of investigation findings that provided us with the opportunity to enhance the safety of our system. We greatly appreciated their assistance in this effort and look forward to continuing to work with them to monitor implementation of the plans.

I also appreciate, and will follow up on, your suggestion that the National Transit Institute (NTI) develop a safety training program for top management. I believe that all top management at the MTA and its operating agencies will benefit from a better understanding of the system safety concept. With the enactment of the Federal Transit Act provision requiring states to oversee the safety of fixed rail guideway systems such training will become of even greater importance across the industry. I am contacting NTI immediately to pursue the possibility of NTI developing and offering a new program that will meet not only the needs of the New York public transportation community, but those of the entire transit industry as well. I hope I can count on FTA to continue to provide its guidance to NTI in the development of this program.

Thank you, once again, for your support of our efforts.

Sincerely,


Peter E. Stangl
Chairman and
Chief Executive Officer

Members of the Board

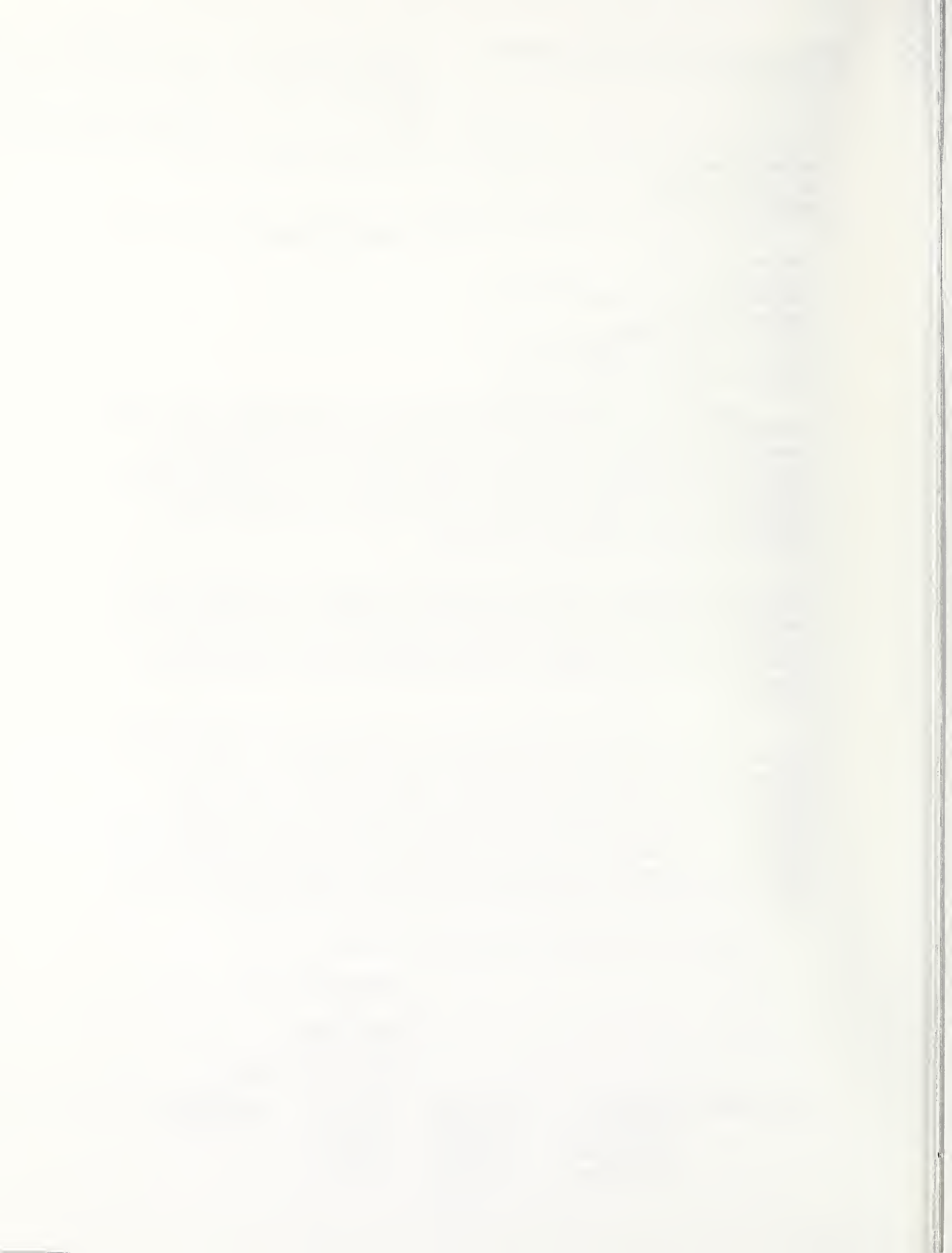
Peter E. Stangl
Chairman and
Chief Executive Officer
Daniel T. Scannell
First Vice Chairman

Ulyan H. Affrillo
Bernard B. Beal
E. Virgil Conway
Warren S. Dohy
Barry Feinstein

Barbara J. Fife
Prerna Mathai-Davis
Neil Novesky
Lucius J. Piccio
Joan Spence

Edward A. Vrooman
Alfred E. Werner

C-5/C-6





DOT LIBRARY



00124276

Lo
08